

Claims

1. An oscillating motor comprising
a shaft;
- 5 a laminated rotor core fitted to the shaft, the rotor core having at least one salient pole;
- a laminated stator core having at least one salient pole;
- at least one stator coil wound about the stator pole;
- at least one permanent magnet fitted to the stator core located circumferentially
- 10 spaced from the stator pole and facing the rotor pole across an air gap, the permanent magnet having two circumferentially spaced magnetic poles;
- whereby alternating current flowing through the stator coil causes the rotor pole to swing between the poles of the permanent magnet.
- 15 2. The motor of claim 1 wherein
- the rotor core has two salient poles;
- the stator core has two salient poles, each stator pole having a respective stator coil;
- there are two permanent magnets fitted to the stator core respectively located
- 20 circumferentially between the stator poles and respectively facing the rotor poles across an air gap;
- wherein the stator coils are wound to induce like magnetic poles in the stator poles which in turn induce like magnetic poles in the rotor poles.
- 25 3. The motor of claim 1 wherein the rotor is biased to a rest position by a return spring.
4. The motor of claim 3 wherein the return spring is a torsion spring in the form of a strip of spring steel attached at one end to the shaft and at another end to a
- 30 stationary part of the motor.
5. The motor of claim 4 wherein the spring has a first end fixed in a slot in an end of the shaft and has a second end located in a slot in the end cap, with the spring extending in the axial direction of the shaft.
- 35 6. The motor of claim 4 wherein the spring is located in a slot in the shaft, extends radially of the shaft and the ends of the spring are located in recesses in the end cap.

7. The motor of claim 1 wherein the salient poles of the rotor core and the stator core physically prevent full rotation of the rotor.
8. The motor of claim 1 wherein the motor has a cup shaped housing closed at one end by an end cap, the housing and end cap each supporting a bearing for rotationally supporting the shaft.
9. The motor of claim 8 wherein the bearings are bushings with a shaft interface surface of self lubricating or low friction material.
10. The motor of claim 9 wherein the low friction material is NiPTFE, PTFE, nylon or hard plastics.
11. The motor of claim 8 wherein one of the bearings is a special bearing which provides a spring function to urge the shaft into a predetermined orientation.
12. The motor of claim 11 wherein the special bearing also seals the shaft to the housing to prevent ingress of moisture.
13. The motor of claim 12 wherein the special bearing and the end cap seal the shaft to the housing.
14. The motor of claim 13 wherein the special bearing comprises an outer ring fixed to the housing or end cap, an inner ring fixed to the shaft for rotation therewith, a web extending between the inner and outer rings and a plurality of ribs extending between the inner and outer rings.
15. The motor of claim 14 wherein the special bearing is a single casting of a resiliently deformable material.
16. The motor of claim 15 wherein the material of the special bearing is selected from the group consisting of rubber, synthetic rubber, rubber like materials and silicone.
17. The motor of claim 14 wherein the special bearing is vulcanized to the motor shaft.

18. The motor of claim 1 wherein the shaft oscillates in an angular range between $\pm 5^\circ$ and $\pm 20^\circ$, preferably between $\pm 5^\circ$ and $\pm 10^\circ$.

19. The motor of claim 1 wherein the motor is arranged to operate on an a.c. supply
5 frequency of between 150 Hz to 350 Hz .